Flare 8 Root Cause And Corrective Action Analysis Report – NSPS Ja

March 20, 2021 through March 21, 2021

Acid Gas Flaring Event

In accordance with Title 40, Part 60, Subpart Ja, provided below is information related to the discharge to the No. 8 Flare in excess of 500 lbs in a 24-hour period in accordance with §60.103a(c) and the recordkeeping and reporting requirements of 40 C.F.R. §60.108a(c)(6). This report also includes information required under the Consent Decree entered in United States, et al. v. HOVENSA, LLC, Civ. No. 1:11-cv-0006.

a. A description of the discharge [40 CFR §60.108a(c)(6)(i)]

Flare #8 experienced an SO_2 exceedance from March 20, 13:00 hours until March 21, 21:59 hours. Prior to this occurrence, there were instances of hydrocarbon carryover. Hydrocarbon carryover to 2GRU originated at the No 9 Distillate Desulfurizer (DD9) Stripper Overhead Drum (D-5306). The feed to #9 DD was too light (too much naphtha in the kerosene) and the level transmitter "stuck" at ~74%, giving operations a false indication of level in the drum when the actual level was above 100% and overflowing into the No 2 Gas Recovery Unit (2GRU) LP Separator and into the amine system, affecting No 5 Amine Recovery Unit (5ARU) and No 4 Sulfur Recovery Unit (4SRU). In addition, the No 4 Sulfur Recovery Unit (4SRU) had to be cut back on rate. This increased back pressure on 5ARU, causing 5ARU to be vented to flare.

b. The date and time the discharge was first identified and the duration of the discharge [40 CFR §60.108a(c)(6)(ii)] & [Consent Decree Paragraph 60.a]

The discharge was first identified on March 20, 1300 hours until March 21, 21:59 hours.

c. The measured or calculated cumulative quantity of gas discharged over the discharge duration. Include measured H_2S, Total sulfur, SO_2, and flow rate as applicable. [40 CFR §60.108a(c)(6)(iii)-(vii)] and calculations used to determine the quantity of SO_2 that was emitted. [Consent Decree Paragraph 60.b]

Appendix 1 to this document includes the data recorded by the data acquisition and handling system related to the continuous monitoring system located at Flare 8. SO_2 emissions are calculated using the total reduced sulfur quantity measured by analyzer in the flare header, the total flow to the flare, and a 99% conversion of total sulfur to SO_2 per 40 CFR §60.108a(c)(6)(vii.)

d. The steps taken to limit the emissions during the discharge and the duration of the discharge. [40 CFR §60.108a(c)(6)(viii)] and [Consent Decree Paragraph 60.c]

Skimming was conducted and 9DDfeed was pulled to bring the SO_2 into compliance. The duration of the event was 33 hours as described in "b" and "c" above.

e. The root cause analysis and corrective action analysis including an identification of the affected facility, the date and duration of the discharge, a statement noting whether the discharge resulted from the same root cause(s) identified in a previous analysis and either a

description of the recommended corrective action(s) or an explanation of why corrective action is not necessary. [40 CFR §60.108a(c)(6)(ix)] and [Consent Decree Paragraph 60.d]

1. *H_2S and other sulfur species were released to Flare 8 from the 2GRU and 5ARU.*
2. *The release occurred from Flare 8, an affected facility under NSPS, Subpart Ja.*
3. *The duration of the event was 33 hours as described in "b" and "c" above.*
4. *The root cause analysis:*

Root Cause Analysis	*Corrective Action Analysis (or explanation that no corrective is necessary)*	*Status: completed within 45 days or schedule with proposed implementation and completion dates*
The incident was caused by level instrumentation failure (5300LC0223). The false reading meant operations could not quickly recognize Hydrocarbon contamination of the amine system.	• *Skimming was conducted and 9DDfeed was pulled to bring the SO_2 into compliance.* • *Pull and inspect level transmitter, 5300LC0223, repair if necessary* • *Provide operator refresher training on the importance of maintaining visual levels in the sight glasses of the overhead separators. Also training on the signs of hydrocarbon via high pressure and gas valves being wide open.*	*Completed within 45 days* *Completed within 45 days* *To be completed by July 30, 2021*

f. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of the discharge resulting from the same root cause or significant contributing causes in the future. The analysis shall discuss all reasonable alternatives, if any, that are available, the probable effectiveness and cost of the alternatives, and whether an outside consultant should be retained to assist in the analysis. Possible design, operation and maintenance changes shall be evaluated. [Consent Decree Paragraph 60.e]

The following corrective measures to reduce the likelihood of a recurrence were identified following the discharge:

- *Skimming was conducted and 9DDfeed was pulled to bring the SO_2 into compliance.*
- *Pull and inspect level transmitter, 5300LC0223, repair if necessary*
- *Provide operator refresher training on the importance of maintaining visual levels in the sight glasses of the overhead separators. Also training on the signs of hydrocarbon via high pressure and gas valves being wide open.*

No other alternatives were identified.

g. For Acid Gas Flaring Incidents (not Hydrocarbon Flaring Incidents), specifically identify each of the grounds for stipulated penalties in paragraphs 63, 64 and 65 and describe whether the Incident falls under any of those grounds. [Consent Decree Paragraph 60.f]

This was partially an acid gas flaring event. This acid gas flaring event is not a result of any of the root causes identified in paragraphs 63 and 64. The root cause of the acid gas flaring event was not a recurrence of the same root cause that resulted in previous acid gas flaring. As such, the provisions of paragraph 65.a.ii apply. Corrective actions were implemented as noted in Section (e) and therefore, stipulated penalties do not apply.

h. For any corrective action analysis for which corrective actions are required, a description of the corrective action(s) completed within the first 45 days following the discharge and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates. [40 CFR §60.108a(c)(6)(x)] and [Consent Decree Paragraph 60.h for supplement report]

See response to "e" above.

i. If the analysis determines that corrective action is not required, the report shall explain the basis for that conclusion. [Consent Decree Paragraph 60.e]

See response to "e" above.

j. For each discharge from a flare that is the result of a planned startup or shutdown of a refinery process unit or ancillary equipment connected to the flare, a statement that a root cause analysis and corrective action analysis are not necessary because the owner or operator followed the flare management plan. [40 CFR §60.108a(c)(6)(xi)]

Not applicable.

Appendix 1 – DAHS Records

Flare 8 Report

Plant: LIMETREE BAY REFINERY

Report Period: 03/20/2021 00:00 Through 03/21/2021 23:59

Source		FLARE08						
Parameter (Unit)		H2SPPMD (PPM) 001H	H2SPPMD (PPM) 003H	TRSPPM (PPM) 001H	SO2LBS (LBS) 001H	SO2LBS (LBS) 024H	VG_FLOWT (SCF) 001H	VG_FLOWT (SCF) 024H
			162	estimated	estimated	estimated		1000000
03/20/21	00:00	71.1	61.7	124.0 I	*6.5* I	*239*	316,787.5	7,997,962.8 E
03/20/21	01:00	58.9	62.0	117.3 I	*8.4* I	*230*	436,902.7	7,966,109.9 E
03/20/21	02:00	63.7	64.5	126.0 I	*8.9* I	*220*	431,213.4	7,835,823.3 E
03/20/21	03:00	68.5	63.7	123.4 I	*5.4* I	*219*	267,126.8	7,906,506.2 E
03/20/21	04:00	61.3	64.5	132.5 I	*9.1* I	*225*	418,075.4	8,260,365.0 E
03/20/21	05:00	50.1 C	60.0	109.4 IC	*8.8* IC	*229*	489,747.9	8,590,073.6 E
03/20/21	06:00	76.9 C	62.7	164.8 IC	*13.0* IC	*236*	478,910.5	8,867,380.0 E
03/20/21	07:00	74.2	67.0	168.2 I	*13.2* I	*242*	475,892.4 *	9,142,121.7 E
03/20/21	08:00	85.5	78.8	184.0 I	*15.4* I	*249*	509,462.4	9,386,375.2 E
03/20/21	09:00	100.2	86.6	202.1 I	*15.9* I	*258*	476,617.1	9,596,120.2 E
03/20/21	10:00	103.1	96.3	210.9 I	*13.8* I	*241*	396,587.3	9,597,032.6 E
03/20/21	11:00	125.1	109.5	223.7 I	*11.1* I	*234*	300,307.5	9,490,665.0 E
03/20/21	12:00	107.1	111.8	204.5 I	*8.3* I	*232*	245,863.8	9,313,765.9 E
03/20/21	13:00	103.8	112.0	205.4 I	*4.8* I	*226*	143,036.8	9,045,324.9 E
03/20/21	14:00	89.3	100.1	193.6 I	*9.4* I	*227*	296,440.5	8,936,666.0 E
03/20/21	15:00	107.6	100.2	205.7 I	*15.8* I	*233*	466,070.3	8,997,002.8 E
03/20/21	16:00	90.7	95.8	183.4 I	*15.2* I	*237*	503,799.9	9,095,082.6 E
03/20/21	17:00	876.4	358.2 E	951.2 I	*82.2* I	*312*	525,242.5	9,306,310.6 E
03/20/21	18:00	889.4	618.8 E	947.2 I	*74.7* I	*381*	479,117.2	9,547,123.8 E
03/20/21	19:00	747.4	837.7 E	803.6 I	*63.0* I	*435*	476,338.7	9,642,123.2 E
03/20/21	20:00	841.2	826.0 E	882.6 I	*69.3* I	*495*	477,144.9	9,735,539.8 E
03/20/21	21:00	534.6	707.7 E	594.7 I	*43.3* I	530.4 E	442,065.6	9,814,975.8 E

F = Unit Offline **E = Exceedance** **C = Calibration** **S = Substituted** **U - Startup**

I = Invalid **M = Maintenance** **T = Out Of Control** *** = Suspect** **D - Shutdown**

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			162	estimated	estimated	estimated		1000000
03/20/21	22:00	117.9	497.9 E	194.1 I	13.7 I	536.5 E	427,635.9	9,866,104.5 E
03/20/21	23:00	83.1	245.2 E	159.8 I	11.9 I	541.2 E	452,075.9	9,932,462.9 E
03/21/21	00:00	71.3	90.7	152.4 I	11.2 I	545.9 E	446,828.9	10,062,504.2 E
03/21/21	01:00	63.2	72.5	145.3 I	10.7 I	548.2 E	447,735.7 *	10,073,337.2 E
03/21/21	02:00	58.4	64.3	140.5 I	10.6 I	549.8 E	456,489.1 *	10,098,612.9 E
03/21/21	03:00	55.8	59.2	135.6 I	10.3 I	554.6 E	459,864.3	10,291,350.4 E
03/21/21	04:00	51.5	55.3	129.4 I	10.0 I	555.5 E	468,538.8 *	10,341,813.8 E
03/21/21	05:00	49.9 C	52.4	126.2 IC	9.8 IC	556.5 E	472,882.4 *	10,324,948.3 E
03/21/21	06:00	56.8 C	52.7	144.1 IC	11.2 IC	554.8 E	473,919.7 *	10,319,957.5 E
03/21/21	07:00	57.2	54.6	146.4 I	11.4 I	553.0 E	473,013.8	10,317,079.0 E
03/21/21	08:00	83.0	65.6	179.2 I	13.9 I	551.5 E	472,788.9	10,280,405.5 E
03/21/21	09:00	62.5	67.5	164.1 I	12.7 I	548.3 E	468,691.3 *	10,272,479.7 E
03/21/21	10:00	65.0	70.1	167.0 I	11.4 I	545.9 E	413,107.0	10,288,999.4 E
03/21/21	11:00	63.9	63.8	163.5 I	12.5 I	547.3 E	464,035.4	10,452,727.4 E
03/21/21	12:00	57.8	62.2	154.2 I	12.1 I	551.2 E	478,194.9	10,685,058.4 E
03/21/21	13:00	55.8	59.2	149.3 I	11.7 I	558.1 E	477,734.1	11,019,755.7 E
03/21/21	14:00	55.0	56.2	147.6 I	11.7 I	560.3 E	481,201.8	11,204,517.0 E
03/21/21	15:00	56.0	55.6	146.8 I	9.4 I	553.9 E	387,265.6	11,125,712.3 E
03/21/21	16:00	54.3	55.1	143.8 I	10.8 I	549.5 E	455,301.1	11,077,213.6 E
03/21/21	17:00	53.8	54.7	143.7 I	10.3 I	478	435,279.7	10,987,250.8 E
03/21/21	18:00	121.3	76.4	197.1 I	14.2 I	417	436,559.7	10,944,693.3 E
03/21/21	19:00	303.3	159.5	365.2 I	26.0 I	380	431,812.4	10,900,166.9 E

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			162	estimated	estimated	estimated		1000000
03/21/21	20:00	76.8	167.1 E	140.2 I	*8.1* I	*319*	352,280.6	10,775,302.7 E
03/21/21	21:00	56.2	145.4	122.8 I	*7.0* I	*282*	346,952.2	10,680,189.2 E
03/21/21	22:00	52.9	62.0	117.9 I	*7.6* I	*276*	391,232.0	10,643,785.4 E
03/21/21	23:00	50.2	53.1	117.8 I	*6.7* I	*271*	345,712.1	10,537,421.6 E

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